Remixing Social Media for Location Sharing on Public Urban Screens

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ABSTRACT
This paper introduces *Sapporo World Window* (hereafter SWW), an interactive social media mash-up deployed in a newly built urban public underground space utilising ten public displays and urban dwellers' mobile phones. SWW enables users to share their favourite locations with fellow citizens and visitors through integrating various social media contents to a coherent whole. The system aims to engage citizens in socio-cultural and technological interactions, turning the underground space into a creative and lively social space. We present first insight from an initial user study in a real world setting.

Keywords
Urban Screens, Mobile Phones, User Experience, Creativity, Japan

INTRODUCTION
In recent years urban screens have been used and deployed in urban landscapes to inform and entertain urban dwellers with a wide variety of content such as public transport timetables, art installations, live transmissions of large sports events, or local advertisement. Such uses of urban screens mostly involve uni-directional communication that pushes information to the public. However, urban screens can also be utilised to enable an open dialog allowing users to create, edit, and comment on the digital content. This enables that the space to be " *formed and shaped by people passing by and not only by mimicking commercial interests*" [4].

Sapporo is the capital city of Hokkaido, the northernmost island of Japan. The city has recently completed the 4-year development of public underground passage that links two major train stations. The passage is designed to promote Sapporo as a "Creative City" especially in the domain of media arts. As such, the passage integrates a hybrid physical virtual space [6] named *North 2,* which contains various large urban screens with webcams and audio speakers. The Sapporo City Council (SCC) envisions to use North 2 as a *"public media space for communicating messages based on citizen's creative activities about creative industry, tourism, art and culture, local government publicity and so on*" [1].

To turn the vision of North 2 into reality, the SCC invited proposals for applications, content, and services to be shown on several public urban screens. Our proposal for SWW, an open social media mash-up for knowledge exchange about creative hot spots and other interesting locations in Sapporo was accepted. This paper presents the study of SWW: research, design, and development towards its implementation and use within the field of urban informatics [4] It explores the opportunities and challenges of augmenting the urban environment through ubiquitous technologies and investigates how "*[a]dding a digital layer to the existing physical and social layers could facilitate new forms of interaction that reshape urban life*" [6].

The remainder of this paper is structured as follows. First we describe the unique characteristics of Sapporo and the newly developed underground space. We then present the SWW system allowing urban dwellers to explore and interact with new locations shared by fellow citizens through their creative digital outputs. Following this, we report on the initial user study. Finally, we discuss future scenarios and opportunities, which concludes the paper.

BACKGROUND
Sapporo is known particularly for its natural environment, fresh food, and long, snowy winter. Nearly one third (approximately 1.9 million) of the Hokkaido population lives in Sapporo [2]. Over 14 million people visit Sapporo annually [2], making the city a vibrant urban hub as the central gateway for Hokkaido.

Central Sapporo is built on two main underground shopping centers – Aurora Town and Pole Town – which consist of about 140 shops, cafes, and restaurant. These two underground shopping centers and surrounding passages / walkways are also known as the Sapporo Chikagai (underground city). The Sapporo Chikagai link Odori Park and Susukino Station, two major traffic hubs of downtown Sapporo. Especially during long and cold winter, the Sapporo Chikagai enables comfortable and efficient traversing through the city without the coldness and traffic lights. The left image of Figure 1 shows a typical passage in the Pole Town; the right image shows an intersection of passages, containing a large public display showing TV shows. These kinds of public spaces in the Sapporo Chikagai are often used as meeting points by urban dwellers.

Figure 1: Urban dwellers using the Sapporo Chikagai

North 2 presents similar potential use but broadens opportunities for citizen engagement through technically advanced features: it is equipped with 6 high definition screens in portrait mode on the west-side wall and 4 high definition screens in landscape mode on the east-side wall. Additional super directive speakers enable audio output and webcams enable video input. Figure 2 visualises the technical infrastructure enabling North 2 to become a public media space as projected by the SCC. Figure 3 shows the six vertical screens on the west-side wall viewed from the east-side wall where four displays are embedded.

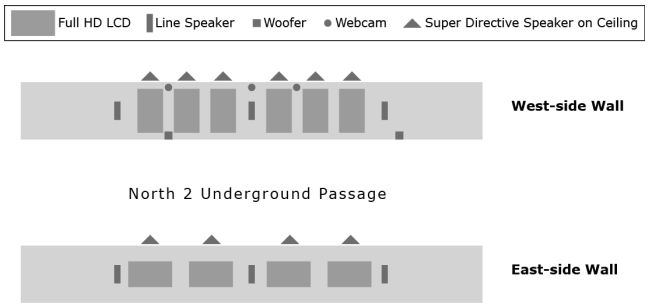

Figure 2: Technical Infrastructure

SWW is built on the notion that "*[u]rban Screens combines the function of the public space for commerce and trade with a cultural role reflecting the wellbeing of urban society: digital moving displays with a new focus on supporting the idea of urban spaces as a space for the creation and exchange of culture and the formation of a public sphere using criticism and reflection*" [7]. SWW aims to turn the fundamentally transient space of North 2 into a lively social place, where people, within a reasonably short period of time, can have unique, meaningful experiences of interacting with places and people of Sapporo through screen-based interactive media.

Five principle guidelines guided the design and development of SWW

a) *Locally specific content, global engagement*. SWW content is produced by citizens of Sapporo about locations in Sapporo engaging locals and visitors alike.
b) *Sustained synergy between private and public sectors through everyday creativity*. SWW allows and integrates all sectors in promoting locations.
c) *Strengthening the connection amongst people place and technology*.
d) *Ease of use*. SWW enables different modes of interactions and participation with various degrees of technological involvement.
e) *Replicability within scalable networks*. SWW should easily be transferable to other cities with similar social media initiatives.

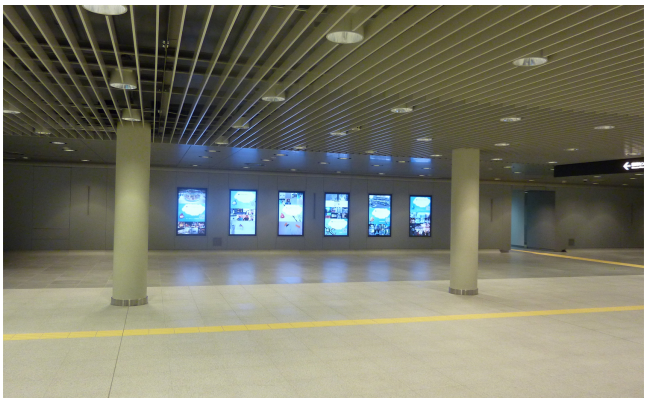

Figure 3: North 2

SAPPORO WORLD WINDOW

As an interactive screen-based application, the main focus of SWW is on enabling and encouraging people to share their creativity and knowledge about places around Sapporo. Each of the six screens on the west-side wall has a designated character, and displays a QR code and a collection of people's creative outputs including videos, images, and comments about places in Sapporo from various social media services such as YouTube, Flickr, Foursquare, and Twitter. Use of QR codes is prevalent in Japan today, with most mobile phones natively equipped with QR code readers. As such, QR codes are featured prominently on the visual interface of SWW; by using QR Codes linking to mobile websites, pedestrians can easily find out more about the places shown on the screens, including what it is, how to get there, and what others have said about the places, as well as expressing their own thoughts. In turn, SWW helps people to turn the passageway into a social place, a "point of connection" that thrives on and inspires people's sharing of creativity and knowledge with the locals and visitors alike.

Figure 4 visualises the overall system enabling SWW. The system consists of three main components: (1) website for content creation, (2) screen applications, and (3) a mobile website for each screen. Content created through the website is stored in a database for generating the screen applications and the respective mobile website when needed. The following subsections discuss SWW in more detail.

Content Creation: *Screen*

In SWW we use the term *Screen* to describe the mash-up content users can create, engage, and interact with. In the current version the *Screen* integrates various kinds of social media, in particular: (1) videos sourced form YouTube, (2) images sourced by Flickr, (3) micro-blogging data from

Figure 4: SWW System Overview

Twitter, (4) location-based information from Foursquare, Google Maps and Google Earth. SWW enables urban dwellers to express their creativity in two different layers of engagement: (1) creating a *Screen* through remixing existing content from the integrated web services, or (2) upload their own media to the respective web services which will be used to create a new SWW *Screen*.

To create a *Screen* for SWW, users need to complete a simple online form with details such as the name and a description of the location, pinpoint the location on a Google Map, specify tags for Flickr and Twitter, and add YouTube URLs as well as Foursquare check-in information if desired.

Content Management

Newly created *Screens* have to be approved through an administration website. The approval mechanism ensures that only appropriate locations that align to the SCC guidelines are shown on the public displays. Other general copyright and legal issues are pre-filtered through inbuilt analysis features the integrated social media platforms already provide. Once approved, the *Screen* will be added to a pool of approved *Screens*. Every 45 minutes the SWW software randomly publishes six *Screens*, which will be shown on the screens via the display scheduling software SCC provides.

Content Presentation

As visualised on the top in Figure 4, each of the six portrait displays on the west-side wall shows one of the SWW *Screens*. The *Screen* consists of 3 main parts: a video frame, a photo frame, and a mixed content frame. The mixed content frame contains one of the six characters, a QR code linking to a mobile website displaying additional information about the location, and a white speech bubble containing text-based information. Users have the option to send messages to each *Screen* and comment on the *Screens* contents, which is then also shown in the white speech bubble.

The four landscape displays located on the east-side wall of the underground space are showing two types of information. First, a Google Earth animation zooming in and out to the geographical positions of the locations presented on the SWW *Screens* currently shown on the other side of the underground. Second, an animation explaining how to use, participate in, and interact with SWW.

INITIAL USER STUDY

For the initial user study, we invited 10 participants to the underground space to interact with the application in the real environment. At the time of conducting the study, the construction of North 2 had already been completed but the site was not open to the general public. Participants consisted of 8 male and 2 female university students and staff, aged between 21 and 37. We first asked the participants to fill out a one-sheet paper based survey to gather demographic information and general questions about how they use the current underground passages in Sapporo. Following this, we asked them to explore North 2 space, and interact with the SWW *Screens*. We conducted an open-ended semi structured focus group with them. The

whole study was conducted in Japanese assisted by a Japanese interpreter. It lasted for approximately 90 minutes, was video recorded and transcribed. The same interpreter who was present at the study verified the English transcription.

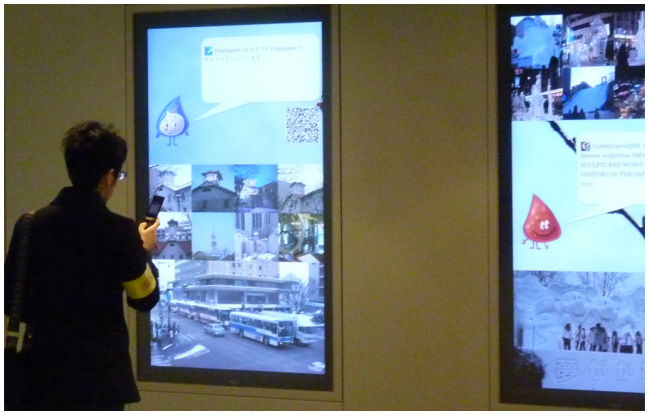

Figure 5: Participant interacting with SWW

The study participants mainly used the existing underground passages for travelling through downtown Sapporo or meeting someone in the downtown area especially during cold days, as the passages provided warmer environment. Participants expected that they would use the new underground walkway for the same purposes. However, after viewing and interacting with SWW as well as other content to be deployed in the space, the participants expressed that they would come to see and "*play*" with the provided technology and information.

One emerging theme from the study was that seeing user-generated content in public urban places was perceived novel. Despite the growing amount of public displays in urban environments in Japan and around the world, interactive user-generated content and services in public places still remain uncommon. Participants found it difficult to differentiate between purposefully prepared promotional content and user generated web 2.0 content.

Participants highlighted three likely scenarios in which they would use SWW. First, participants expressed that North 2 would be a great meeting place, and that they would probably interact with the screens while waiting for someone in the space. Second, users pointed out that they would more likely use the application when they are in a group rather than on their own. The third scenario is directly related with the physical characteristics and constrains of the underground space. Because there are no shops or cafes in near vicinity of North 2, the space is used for constant movement (for walking). Participants said they would likely stop and interact with the screens if they see content that deals with subjects of their interest. This highlights the need for locally produced content about various niche and locally-specific points of interest rather than well-known and touristic locations. One participant stated:

"If I [could] get some non-mainstream local, 'underground' information about smaller clusters to which some of my friends may belong, then it's going to be a lot of fun for me [to use SWW]."

Study participants described SWW as a fun tool for local knowledge exchange within the city, which can transform the public space into a place of social collaboration and thus animating Sapporo as a whole.

CONCLUSION AND FUTURE WORK

In this paper, we presented SWW, an interactive social media mash-up deployed in a public urban underground space employing 10 public displays and users mobile phones. SWW allows users to easily share and exchange knowledge within a community.

The initial study provided promising insights into how the application could be used and perceived by the citizens of Sapporo for positive transformation of the community and the city. We wish to content further observational study on how real users interact with the system during their daily lives. This will provide further knowledge into how different levels of engagement with SWW - from spectator to participant, then to creator - can change people's experiences of the public urban place.

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